ABSTRACT

Time-correlation methods for determining pulse characteristics from a modelocked ultrafast laser include a cross-correlation method and an auto-correlation method. In the cross-correlation method, pulses from the laser and pulses from another modelocked laser are incident on a two-photon detector that responds when the pulses overlap in time. The lasers are synchronized to the same frequency and the phase difference between pulses from the two lasers is varied to vary the temporal pulse overlap while recording the detector response. Pulse characteristics are determined from recorded data representing the detector response as a function of phase difference. In the auto-correlation method, pulses from one laser are divided into two components. One component follows a fixed delay path before being temporally overlapped at the detector with another component that has not been delayed. The temporal overlap is varied by varying the pulse repetition frequency. Pulse characteristics are determined from recorded data representing the detector response as a function of phase difference.